

QUICK REFERENCE CHART

The information below can help you solve some of those simple but hair-pulling problems that frustrate even the best of us. We hope you find it helpful.

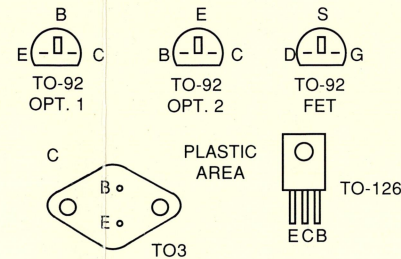
Helpful hints on laying out printed circuit boards for automatic insertion and wave soldering.

- Arrange all polarized components the one way
- All axial components of a similar package to be same leg spacing, e.g. 1/4 watt resistors—0.5"
- Put more copper on the bottom than the top of the board
- Provide test points for key voltages
- When laying out silk screen component legend, use the following references:

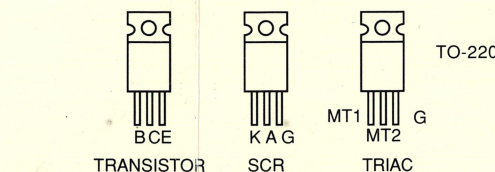
Component labels

Capacitor	C
Connector	J or P
Crystal	Y
Diode	CR
Inductor	L
Integrated Circuit	IC, A or U
Lamp, Light	DS
Meter	M
Relay	K
Resistor	R
Switch	S
Terminal Board	TB
Terminals	E
Test Point	TP
Transformer	T
Transistor	Q
Vacuum Tube	V
Voltage Rectifier	VR or CR

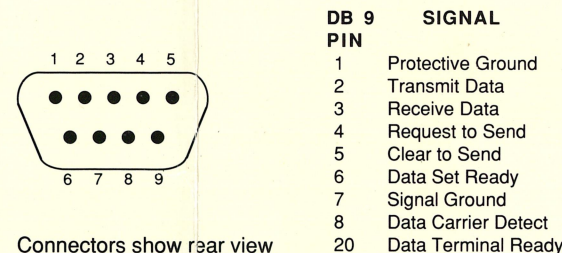
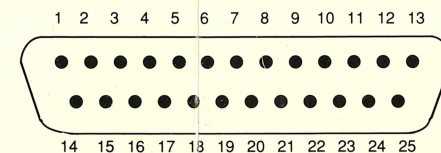
SEMICONDUCTOR OUTLINES



TO-3 AND TO-92 VIEWED FROM UNDERSIDE.



RS 232-C (V.24) SERIAL INTERFACE



Connectors show rear view

9 PIN to 25 PIN RS 232 CONVERSION

DB9	1	2	3	4	5	6	7	8	9
DB25	8	3	2	20	7	6	4	5	22

CAPACITOR MARKINGS

Polarised (look for +)

10,000μ		
1,000μ		1,000
107	100μ	100
476	47μ	47
226	22μ	22
106	10μ	10
475	4μ7	4.7 4.7

May be unpolarised

225	2μ2	2.2 2.2
105	1μ0	1.0 1
470N	474 0μ47	0.47 .47
220N	224 0μ22	0.22 .22
100N	104 0μ1	0.1 .1

Not polarised

47N	473	0.047 .047
22N	223	0.022 .022
10N	103	0.01 .01
4N7	472 4700P	.0047
2N2	222 2200P	.0022
1N0	102 1000P	.001
N47	471 470P	
N22	221 220P	
N10	101 100P	
470	47P	
220	22P	
100	10P	

Tolerances

J	=	±5%
K	=	±10%
M	=	±20%

There may be other values in between for example:

10N	18N	22N	27N	33N	47N
.1	.12	.15	.39	.47	.68 1.0

SI UNITS

10 ¹²	tera	T
10 ⁹	giga	G
10 ⁶	mega	M
10 ³	kilo	k
10 ²	hecto	h
10	deka	da
10 ⁻¹	deci	d
10 ⁻²	centi	c
10 ⁻³	milli	m
10 ⁻⁶	micro	μ
10 ⁻⁹	nano	n
10 ⁻¹²	pico	p

CAPACITOR TYPES

Aluminium Electrolytic

- Filtering and smoothing rectified A.C. e.g. Power Supplies
- Bypassing and coupling in audio applications
- Timing for non-critical circuits

Solid Tantalum

- Low leakage, high reliability, long life, small size

Ceramic

- Low cost, high capacitance, small, two types:
 - For high tolerance and stability in RF tuned circuits
 - Bypass capacitors for power spike suppression and filtering

Paper

- For power factor correction—in lighting and electric motors

Polyester --Greencaps

- General purpose, lowest cost

Polycarbonate

- Low temperature coefficient
- Lower dielectric losses

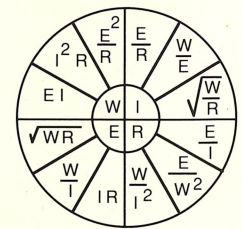
Polystyrene

- High tolerance, high stability—with ferrite coils makes stable tuned circuits & oscillators

Polypropylene

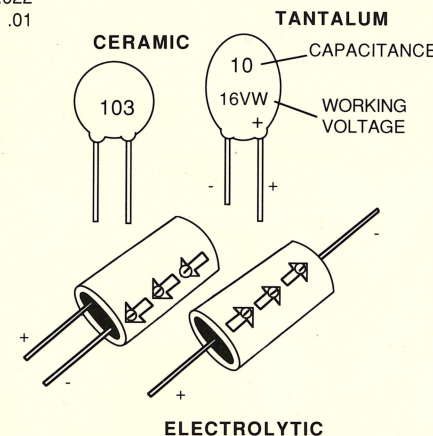
- Very low dielectric losses
- Suitable for high power inverters, converters and T.V. deflection

OHMS LAW

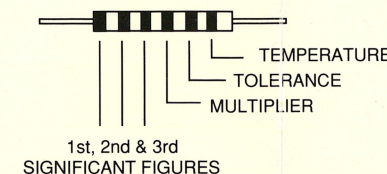


RESISTOR COLOUR CODES

The figure below shows the layout for resistors displaying six colour bands. For five band resistors, the temperature coefficient is not shown. For four colour bands, one significant figure is also omitted. For three colour bands, the tolerance and one significant figure are omitted.



MULTIPLIER	TOLERANCE	TEMPERATURE COEFFICIENT	COLOUR
0		200 ppm	BLACK
1	1%	100 ppm	BROWN
2	2%	50 ppm	RED
3		15 ppm	ORANGE
4		25 ppm	YELLOW
5	5%	5 ppm	GREEN
6			BLUE
7	0.25%	10 ppm	VIOLET
8	0.1%		GREY
9	0.05%		WHITE
10 ⁻¹	5%		GOLD
10 ⁻²	10%		SILVER



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